EXHIBIT 7

On-Line Education

Web ProForums options

- Order IEC Web ProForum Tutorials CD-ROM
- Sponsorship Prospectus
- Principal Sponsors

BROWSE

- All
- New Tutorials
- Broadband Access
- Business and Strategy Issues
- Electronic Design Engineering
- Fixed Wireless
- Mobile Wireless
- Network Components and Design
- Optical Technologies and Networks
- OSS, Network Management, and Testing
- Packet Networking
- Services and Applications
- Switching, Signaling, and Network Intelligence

PROGRAMS

- iForums
- Web ProForums
- Virtual Exhibits
- Communications Technologies Program

SEARCH

Search!

Site Map

REGISTERED USERS AREA

Our registered users enjoy exclusive access to selected white papers and multimedia iForums. Consider these and other benefits of our FREE registration, or register by clicking here.

Already a registered user? Please click here to log in.

Internet Protocol Television (IPTV)

Definition and Overview

Definition

IPTV is a system used to deliver digital television services to the consumers who are registered subscribers for this system. This delivery of digital television is made possible by using Internet Protocol over a broadband connection, usually in a managed network rather than the public Internet to preserve quality of service guarantees. Often, this service is provided together with Video facility on demand. In addition to this, there is provision to include Internet services such as web access and Voice over Internet Protocol (VoIP). In cases when internet service is also provided, it may be called Triple Play.

Today, IPTV is creating headlines all over the world. This mass publicity is the result of numerous instances and stories depicting its humble deployments and its future. IPTV is a very useful system, through which you can receive both TV and video signals along with other multimedia services by means of your Internet connection. In a nutshell, it is nothing but a broadband connection and a system to deliver various programs of television using the Internet protocol (i.e., language) over computer networks.

Overview

It is important to remember that IPTV is not like any ordinary television program broadcast through the Internet, but rather it is unique in itself. Its contour is represented by a closed, proprietary TV system which is similar to the cable services present today. But, in contrast, the delivery of IPTV is made via IP-based secure channels, which result in a sharp increase in content distribution control.

The role of IPTV is to integrate numerous ways to scrutinize and trace choices of users. Its role is also to mark out the preferences and selections over a particular time period. It is therefore emerging as a perfect platform on which clients add personalized e-commerce options and a more targeted advertising. By now, IPTV has turned out to be a widespread denominator for systems where both television and video signals are circulated to subscribers or viewers.

IPTV uses a Internet Protocol over broadband connection and very often this service has been provided in parallel with the Internet connection of the subscriber, supplied by an operator dealing with broadband. This is done by using the same infrastructure but apparently over a dedicated bandwidth allocation. Hence, we can describe it as a system in which a digital television service is provided to subscribing consumers over a broadband connection using the Internet Protocol.

Moreover, one must also remember that IPTV is noticeably different from "Internet Video". Internet Video provides services to watch videos, such as movie previews and web-cams. This service is a so-called "best effort" by providers of Internet, which has no back-to-back service management along with quality of service considerations.

In contrast, IPTV technology is more advanced, user friendly, and incorporated with the higher speed digital subscriber line (DSL) access technologies, such as asymmetric digital subscriber line (ADSL2), ADSL2+ and very-high-data-rate digital subscriber line (VDSL). This certainly offers eye-catching revenue-generating opportunities for the telecom service providers. Therefore, IPTV allows the service providers to participate and to compete efficiently in the so-called "triple play" market space. It is important to note here that the service is very prompt and effective with the delivery of voice, data, and video services to customers who can be both residential and business related.

DOWNLOAD PDF of this tutorial

TABLE OF CONTENTS:

On-Line Education

Web ProForums options

- Order IEC Web ProForum Tutorials CD-ROM
- Sponsorship Prospectus
- Principal Sponsors

BROWSE

- All
- New Tutorials
- Broadband Access
- Business and Strategy Issues
- Electronic Design Engineering
- Fixed Wireless
- Mobile Wireless
- Network Components and Design
- Optical Technologies and Networks
- OSS, Network Management, and Testing
- Packet Networking
- Services and Applications
- Switching, Signaling, and Network Intelligence

PROGRAMS

- iForums
- Web ProForums
- Virtual Exhibits
- Communications Technologies Program

SEARCH

Search!

Site Map

REGISTERED USERS AREA

Our registered users enjoy exclusive access to selected white papers and multimedia iForums. Consider these and other benefits of our FREE registration, or register by clicking here.

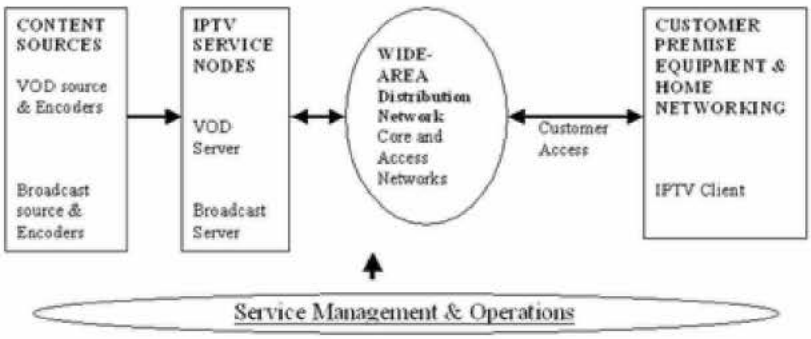
Already a registered user? Please click here to log in.

Internet Protocol Television (IPTV)

1. Short History of IPTV

IPTV is basically a fusion of voice, video, and data service. It is not a new idea or, rather, development, but it is a result of high bandwidth and high speed Internet access. In earlier days, the speed of the Internet did not suit the concept and, as a result, it affected the voice and video services. In recent times, the speed of Internet and bandwidth has increased considerably, making IPTV prevail and become reasonably successful. Also, first generation Set Top Boxes were prohibitively expensive. Technology costs now permit a viable business model.

Figure 1. Process per User Model



Back Next

DOWNLOAD PDF of this tutorial

TABLE OF CONTENTS:
Definition and Overview
1 Short History of IPTV
2 IPTV Architecture
3 IPTV vs. Internet Television
4 Application and Services
5 Protocol
6 Advantages of IPTV
7 Conclusion
Comment on This Tutorial

On-Line Education

Web ProForums options

- Order IEC Web ProForum Tutorials CD-ROM
- Sponsorship Prospectus
- Principal Sponsors

BROWSE

- All
- New Tutorials
- Broadband Access
- Business and Strategy Issues
- Electronic Design Engineering
- Fixed Wireless
- Mobile Wireless
- Network Components and Design
- Optical Technologies and Networks
- OSS, Network Management, and Testing
- Packet Networking
- Services and Applications
- Switching, Signaling, and Network Intelligence

PROGRAMS

- iForums
- Web ProForums
- Virtual Exhibits
- Communications Technologies Program

SEARCH

Search!

Site Map

REGISTERED USERS AREA

Our registered users enjoy exclusive access to selected white papers and multimedia iForums. Consider these and other benefits of our FREE registration, or register by clicking here.

Already a registered user? Please click here to log in.

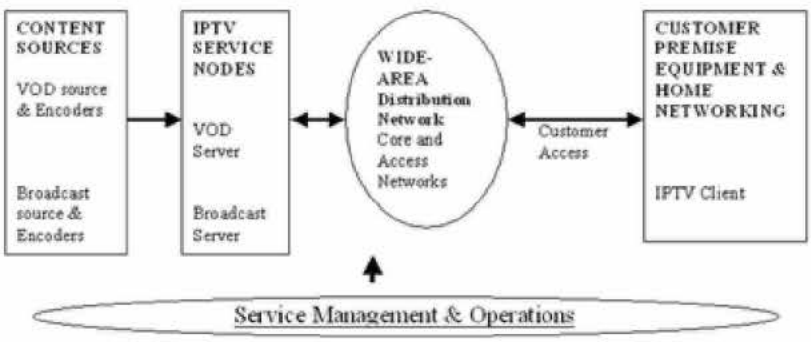
Internet Protocol Television (IPTV)

2. IPTV Architecture

Telephone companies will most likely be the first ones to offer IPTV service. Later on, this facility will be extended to other current television carriers. IPTV is not a costly affair, and it is even both operator and consumer friendly. Because it uses the Internet and sends less information compared to standard analog or digital television, IPTV promises both lower costs for operators and lower prices for consumers. The use of set-top boxes through broadband or DSL Internet is very helpful to transfer video signals. Therefore, video can be streamed to households more efficiently compared to signaling by coaxial cable. In addition to its higher speed, it can record multiple programs at once by use of digital video recorders (DVR). In ROI terms, the copper was already paid for by the phone service and the fibre/DSL by the broadband service. Therefore, IPTV only has incremental costs.

Let us have a look at the architecture of IPTV through Figure 1:

Figure 1: Generic IPTV System Architecture



The IPTV architecture consists of the following functional components:

Content Sources: The 'Content Source' is defined as a functionality which receives video content from producers and other sources. Afterwards, these contents are encoded and store in an acquisition database for video-on-demand (VoD)

Service Nodes: The 'Service Node' is defined as a functionality which receives video streams in different formats. These video streams in different formats then reformat and encapsulate it for transmission with appropriate quality of service (QoS) indications to the wide-area network. This makes it ready for delivery to customers. In regards to service management, the Service Nodes communicate with the customer premises equipment (CPE); for the subscriber, session and digital rights management, service nodes communicate with the IPTV service.

Wide Area Distribution Networks: The Wide Area Distribution Network is made up of distribution capability, capacity, and quality of service. It also consists of other capabilities, such as multicast, which is necessary for the reliable and timely distribution of IPTV data streams from the service nodes to the customer premises. Moreover, the core and access network cover the optical distribution backbone network and the various digital subscriber line access multiplexers (DSLAMs). This is located at the central office or remote distribution points.

Customer Access Links: In the customer access links, high-speed DSL technologies such as ADSL2+ and VDSL are required; with the help of such technology, customer delivery can be provided over the existing loop plant and through phone lines to homes. There are some other options available. Service providers may use a combination of fiber-to-the curb (FTTC) and DSL technologies for delivery to

customers. They can also implement direct fiber-to-the-home (FTTH) access. However, good results depend on the richness of their IPTV service offerings.

Customer Premises Equipment (CPE): In context of IPTV, the CPE device is located at the customer premises. This provides the broadband network termination (B-NT) functionality. At a minimum, it may also include other integrated functions which can be routing gateway, set-top box, or home networking capabilities.

IPTV Client: The IPTV client is a functional unit which terminates the IPTV traffic at the customer premises. This is only a device, such as a set-top box, which performs the functional processing. The functional processing includes setting up the connection and QoS with the service node, decoding the video streams, channel change functionality, user display control and connections to user appliances such as a standard definition television (SDTV) or a high definition television (HDTV) monitor.

Back Next

DOWNLOAD PDF of this tutorial

TABLE OF CONTENTS:
Definition and Overview
1 Short History of IPTV
2 IPTV Architecture
3 IPTV vs. Internet Television
4 Application and Services
5 Protocol
6 Advantages of IPTV
7 Conclusion
Comment on This Tutorial

On-Line Education

Web ProForums options

- Order IEC Web ProForum Tutorials CD-ROM
- Sponsorship Prospectus
- Principal Sponsors

BROWSE

- All
- New Tutorials
- Broadband Access
- Business and Strategy Issues
- Electronic Design Engineering
- Fixed Wireless
- Mobile Wireless
- Network Components and Design
- Optical Technologies and Networks
- OSS, Network Management, and Testing
- Packet Networking
- Services and Applications
- Switching, Signaling, and Network Intelligence

PROGRAMS

- iForums
- Web ProForums
- Virtual Exhibits
- Communications Technologies Program

SEARCH

Search!

Site Map

REGISTERED USERS AREA

Our registered users enjoy exclusive access to selected white papers and multimedia iForums. Consider these and other benefits of our FREE registration, or register by clicking here.

Already a registered user? Please click here to log in.

Internet Protocol Television (IPTV)

5. Protocol

As already discussed, IPTV covers both Live TV, i.e., multicasting, as well as stored video or VoD. The requirements for playback of IPTV are either a personal computer or a "set-top box" connected to a TV. Typically, the video content is a moving pictures expert group (MPEG) 2-transport stream (TS) delivered via IP multicast. This is a method in which information can be sent to multiple computers at the same time, with the newly released H.264 format predesigned to replace the older MPEG-2. In standard-based IPTV systems, the primary underlying protocols used for IPTV are Internet group management protocol (IGMP) and real time streaming protocol (RTSP). Here, IGMP is the version 2 for channel change signaling for Live TV and RTSP for VoD.

Currently, only one alternative exists to IPTV which is the traditional TV distribution technology covering terestial, satellite and cable TV. However, when there is a possibility for the cable TV, it can be upgraded to two-way capability system and thus also carry IPTV. Another alternative available is VoD which is usually delivered in the US over cable TV through the digital video broadcasting (DVB) protocol, but it is not labelled as IPTV services.

Back Next

DOWNLOAD PDF of this tutorial

TABLE OF CONTENTS:
Definition and Overview
1 Short History of IPTV
2 IPTV Architecture
3 IPTV vs. Internet Television
4 Application and Services
5 Protocol
6 Advantages of IPTV
7 Conclusion
Comment on This Tutorial

On-Line Education

Web ProForums options

- Order IEC Web ProForum Tutorials CD-ROM
- Sponsorship Prospectus
- Principal Sponsors

BROWSE

- All
- New Tutorials
- Broadband Access
- Business and Strategy Issues
- Electronic Design Engineering
- Fixed Wireless
- Mobile Wireless
- Network Components and Design
- Optical Technologies and Networks
- OSS, Network Management, and Testing
- Packet Networking
- Services and Applications
- Switching, Signaling, and Network Intelligence

PROGRAMS

- iForums
- Web ProForums
- Virtual Exhibits
- Communications Technologies Program

SEARCH

Search!

Site Map

REGISTERED USERS AREA

Our registered users enjoy exclusive access to selected white papers and multimedia iForums. Consider these and other benefits of our FREE registration, or register by clicking here.

Already a registered user? Please click here to log in.

Internet Protocol Television (IPTV)

6. Advantages of IPTV

Now, let us have a look at the various advantages of IPTV. It has already been established that IPTV system conserves bandwidth. But there are many more advantages beyond this.

In IPTV, a new level of interactivity among Internet, voice, and video can be established. This enables new types of services which were previously unavailable over stacked networks. For example, in traditional cable TV networks, video transmission is beamed over MPEG streams on an explicit portion of the bandwidth. On the other hand, high-speed data products, such as cable- and modem-based Internet service, are delivered over an IP based network. It is separate from the broadcast TV network that uses MPEG transmission. In this case, both services were delivered via an IP network then, in such a situation, overlapping products are possible. Interactive TV is a good example which often relies on data-centric applications. Today, the delivery of such applications is quite complex due to the separation of IP packets from MPEG streams. These would be missing if such IP packets delivered all video and data.

Another very distinctive advantage of IPTV is that numerous channels can be beamed to the viewer. The operator has a very meager choice in regards to the traditional network. Due to the scarcity of choices and space available, the operator chooses the networks which are later beamed. This doesn't allow for market segmentation, and ultimately the highest levels of satisfaction are missing. In contrast, in the case of IPTV, the "switching" is carried out in the network which is just the right fit for services such as VoD. Another distinctive feature is that IPTV delivery consists of a return path, which ensures the facilitation of advanced products.

IPTV can be very helpful in providing web-based training to courses. If we take a case of large size courses, they contain many sections and instructors that can easily share video materials. Therefore, if you own an instructional video which needs to cover ten sections of a course, IPTV can greatly extend its service. The video can be put on IPTV and then all the ten sections could be viewed at one time, or each instructor will have the freedom to schedule a broadcast time for their concerned section. As a result, this removes the scheduling conflicts, if any. Moreover, appearances of any valuable guest lecturers can be recorded and kept for future use. The recording can be used for multiple courses and can be viewed semester after semester. In addition, different orientations, which are given to a large group of people on a regular basis, can be recorded and stored. The recording can be viewed through IPTV, which is possible as long as you have rights from the publishing company to do so.

The point to remember is that video broadcasts made through IPTV is automatically archived in Real Media format, which is stored on a real server. This facility allows the students, who could not view the broadcast or watch the same video, to view it later, either on or off campus. However, Real Media is not a multicast system and therefore has a limited bandwidth capacity.

IPTV can report detailed levels of usage and viewership which can allow the operator to report statistics of programs/channels/adverts watched as well as be able to bill using various methods of bundled or a-la-carte content....billed by the second, minute, month or par per view.

Back Next

DOWNLOAD

TABLE OF CONTENTS:
Definition and Overview
1 Short History of IPTV
2 IPTV Architecture

On-Line Education

Web ProForums options

- Order IEC Web ProForum Tutorials CD-ROM
- Sponsorship Prospectus
- Principal Sponsors

BROWSE

- All
- New Tutorials
- Broadband Access
- Business and Strategy Issues
- Electronic Design Engineering
- Fixed Wireless
- Mobile Wireless
- Network Components and Design
- Optical Technologies and Networks
- OSS, Network Management, and Testing
- Packet Networking
- Services and Applications
- Switching, Signaling, and Network Intelligence

PROGRAMS

- iForums
- Web ProForums
- Virtual Exhibits
- Communications Technologies Program

SEARCH

Search!

Site Map

REGISTERED USERS AREA

Our registered users enjoy exclusive access to selected white papers and multimedia iForums. Consider these and other benefits of our FREE registration, or register by clicking here.

Already a registered user? Please click here to log in.

Internet Protocol Television (IPTV)

7. Conclusion

Among the diverse areas within an IPTV solution, which are to be addressed, it is obvious that the standardization process related to it is in its early stages. In the different parts of the whole system, many entities are working. However, so far, the observation is that there is little coordination among them. After issuing a standard offer, it can be observed that one component of a system is a good step forward, but too little. Now for IPTV the need of the hour is to gain mass acceptance and to reach to the optimum technical and commercial success as per everyone's expectation. In order to achieve this, the IPTV market must make itself free from closed solutions, which may hamper the following three goals: innovation, development, and competition.

In regards to the future of IPTV, it can only follow one path, which is close to what the market has witnessed in the traditional broadcast world. Moreover, it is important to note that this market has built an open system, which is well defined and relies on open standards. To make IPTV successful and perfect as per expectations, it has to guarantee the interoperability between all the building blocks. But, the conformance program related to it is critical.

Back Next

DOWNLOAD PDF of this tutorial

TABLE OF CONTENTS:
Definition and Overview
1 Short History of IPTV
2 IPTV Architecture
3 IPTV vs. Internet Television
4 Application and Services
5 Protocol
6 Advantages of IPTV
7 Conclusion
Comment on This Tutorial